

CHAPTER 4

Issue Identification

The mission of the South Florida Water Management District (SFWMD or District) is to manage and protect the water resources of the Lower West Coast (LWC) Planning Area by balancing and improving water quality, flood control, natural systems and water supply. Pursuing this mission requires the District to assess the water resources, identify where and when environmental limits may be reached, and take actions to prevent harm to the resources. Rapid growth in southwest Florida has created challenges for water suppliers for years. It was recognized more than a decade ago, in the *1994 Lower West Coast Water Supply Plan*, that the area was approaching the safe supply limits for traditional sources, including fresh groundwater and surface water from the Caloosahatchee River. As a result, the primary new supplies for public water systems in the LWC Planning Area have been developed from alternative water sources. Considering the projected increase of approximately 674,000 residents by 2025, water users and suppliers in the LWC Planning Area must continue to look primarily to alternative supplies, such as brackish water, reclaimed water, and the capture and storage of seasonal surface water supplies, to meet the majority of new water supply needs.

Key issues identified in the *1994 and 2000 LWC Water Supply plans* (SFWMD 1994, 2000) and the *2000 Caloosahatchee Water Management Plan* (SFWMD 2000) were that existing conventional supplies, primarily fresh groundwater and surface water from the Caloosahatchee River, would not be adequate to meet future water demands in the LWC Planning Area. The plans proposed alternative supply development to help meet future needs. These and other key issues are confirmed in this 2005–2006 Lower West Coast (LWC) Plan Update and are summarized as follows:

- Saltwater intrusion, wetland protections and interference with existing users and other concerns will continue to significantly limit increased supplies from these resources.
- Changes to the operational schedule for Lake Okeechobee associated with efforts to lower the lake level for lake and estuarine protection, as well as levee protection, will affect supply availability from the Caloosahatchee River.
- Freshwater high-flow discharges from the Caloosahatchee River and other altered surface water systems in the LWC Planning Area are impacting coastal resources and estuaries. Capturing some of the excess surface and storm water for water supply purposes would improve water supply availability and benefit the environment.
- Additional water storage is needed to create opportunities to fully use reclaimed water and seasonal surface water resources to meet urban irrigation needs.

LIMITED TRADITIONAL SOURCES REQUIRE DEVELOPMENT OF ALTERNATIVE WATER SOURCES

Increasing demand coupled with resource limitations in the LWC Planning Area require the development of alternative water supplies and improved management of traditional supplies. As described in **Chapter 2**, the LWC Planning Area's population is projected to grow to about 1.6 million by 2025. This represents an estimated 74 percent increase in population or approximately 674,000 additional residents from 2005 to 2025. Urban water demands, which include Public Water Supply, Domestic Self-Supply, Recreational, Commercial and Industrial, and Power Generation uses, are projected to increase by 180 million gallons per day (MGD) during this 20-year period, while agricultural water use is expected to increase by 17 MGD, from the current 405 MGD to 422 MGD in 2025.

Multiple Issues Limit New Traditional Supplies

Multiple factors, including water quality deterioration, interference with other existing users and protection of wetlands, continue to limit development of additional fresh groundwater supplies. New supplies from the Caloosahatchee River may be limited by efforts to protect the lake from high water levels and concerns for the integrity of the Herbert Hoover Dike.

Water quality deterioration is occurring in the Surficial Aquifer System (SAS) and Intermediate Aquifer System (IAS) in coastal Lee and Collier counties, and in various inland areas where pumping from the Mid-Hawthorn and Sandstone aquifers is concentrated. The water table and Lower Tamiami aquifers are the primary producing zones in the SAS, while the Sandstone and Mid-Hawthorn aquifers are the primary producing zones in the IAS. A natural upward head (water level) gradient from the more saline FAS exists in most of the LWC Planning Area, creating the potential for more saline water to flow from the higher pressure FAS into shallower, lower pressure aquifers. Head reductions in the shallower aquifers that typically occur as a result of pumping and drought allow increased leakage from the FAS to the shallower aquifers and contribute to the deterioration in water quality in the freshwater aquifer systems (Schmerge 2001, and Shoemaker and Edwards 2003).

Aquifer water levels in the Sandstone/Mid-Hawthorn aquifers in Cape Coral are declining rapidly, and, if present trends continue, could reach maximum developable limits (MDLs) within about three years. Water levels in the Sandstone Aquifer in Lehigh Acres show a declining trend and significantly increased seasonal water level fluctuations associated with increased pumpage. Chronic water shortage conditions develop during dry periods for users of the SAS and IAS, particularly in the Cape Coral and Lehigh Acres areas. Concentrations of domestic wells producing from the same aquifers in these areas result in seasonally low water levels, contributing to well failures and water quality deterioration. Increasing population resulting in construction of additional domestic wells each year exacerbates these problems. Alternatives to the continued development of these

resources for high-density domestic self-supply must be considered by local governments. Accelerating the extension of public water supply lines to such communities coupled with mandatory hook-up to available municipal lines and required proper abandonment of domestic wells should be considered. Modifications to existing landscape ordinances to further minimize outdoor water needs should also be evaluated.

Water levels in the Lower Tamiami Aquifer in the Bonita Springs area are beginning to increase due to reduction of pumpage. The rising water levels reflect the successful development of brackish water supplies in Bonita Springs from the deeper Lower Hawthorn Aquifer and a corresponding reduction in pumpage from the Lower Tamiami Aquifer. Sustained increases in Lower Tamiami water levels will reduce saline water intrusion and aid in managing and preserving this groundwater resource.

Consumptive use permitting (CUP) regulations were revised in 2003 and included a better definition of wetland protection from pumping-related drawdown to wetland systems. The CUP criteria restrict development of new fresh groundwater supplies that may adversely affect wetlands. Additional freshwater supplies may be available in some portions of the LWC Planning Area, but finding permissible sites has been and will continue to be challenging. Site-specific investigations will be needed. Opportunities may also be created by retiring existing nonpotable uses when land uses change or when reclaimed water is supplied, and by designing dry season recharge systems that rely on supplies of reclaimed water or surface water captured during the wet season.

The Caloosahatchee River currently supplies a large percentage of agricultural water to meet demand in the Hendry and Glades county portions of the LWC Planning Area. Minimum flows and levels were established in 2002 for the Caloosahatchee River and Estuary that restrict withdrawals in the low range of flows. Initial water reservations and Comprehensive Everglades Restoration Plan (CERP) project reservations that will be developed for the Caloosahatchee River will be designed to protect the environment and existing users, but create considerable uncertainty about the availability of water to support new withdrawals directly from the system, or new withdrawals that indirectly affect the system. In addition, maintaining lower management levels on Lake Okeechobee due to the condition of the Herbert Hoover Dike will further reduce water availability from the Caloosahatchee River, particularly in the dry season. The combination of environmental protections, protecting existing legal users and ensuring public safety will significantly reduce opportunities for new withdrawals from the Caloosahatchee River.



Caloosahatchee River and Estuary

Constraints to Optimal Use of Reclaimed Water

Additional storage, primarily aquifer storage and recovery (ASR), for reclaimed water and surface water would significantly improve opportunities to make optimal use of these resources. Reclaimed water use in the LWC Planning Area currently averages about 72 MGD. Although only about 80 MGD is available from reuse facilities on an annual average basis in this region, the timing of reclaimed availability is problematic and, in fact, is one of the factors that limit the number of reclaimed water customers that can be connected. During the wet season, large quantities of reclaimed water are available, but demand is typically low, resulting in the need to discharge some of the reclaimed supply. During the dry season, demand for reuse water increases significantly, often exceeding the available supply from wastewater treatment facilities, and resulting in the need to augment the reclaimed supply using surface and groundwater water withdrawals.



Reclaimed Water Facility

One issue affecting development of additional ASR is the potential localized mobilization of arsenic in the aquifer associated with the injection and storage of water. Although this has not been shown to be an issue in all ASR situations, it has occurred in some storage zones in Florida. Developing regulatory and scientific means to address the arsenic mobilization issue that will protect public health and safety, while enabling the development of this critical storage, will help ensure a sustainable and economical water supply for the region in the future.

Collectively, urban irrigation demands are met using reclaimed water, the municipal potable system, private domestic wells, other permitted wells (for golf courses, etc.), surface water withdrawals, or any combination of these options. Additional ASR would allow more optimal use of the reclaimed and surface water resources; enable the connection of additional users to the reclaimed system; and, reduce the need to use other freshwater sources to meet urban irrigation demands.

Maximizing Reclaimed Water Efficiencies

The LWC Planning Area has been a leader in the development of reclaimed water supplies, but must continue to make improvements to the region's system. Such improvements will enhance the system's effectiveness to meet urban irrigation demands and lessen the need for pumping fresh groundwater for urban irrigation. These improvements should include, but not be limited to:

- Implementation of additional ASR to enable storage of reclaimed water during low-demand periods and facilitate the capture of seasonal surface water resources.
- Retrofit of all wastewater treatment facilities to produce reclaimed water. Such retrofits are currently planned at four existing wastewater treatment facilities.
- Continue interconnection of reclaimed water systems through the Regional Irrigation Distribution System (RIDS) Project. Interconnection would also promote regional ASR opportunities.
- Continue reclaimed water distribution system expansion, and require lawn/landscape/turf irrigation permit holders within a reasonable distance of reclaimed lines to connect and use that supply when available.
- Improve efficiency of reclaimed water use for irrigation, especially by domestic users.

Alternatives

Alternatives to development of additional traditional sources to meet increased water needs include development of brackish groundwater in the Lower Hawthorn Aquifer; expansion of the reclaimed distribution and supply system; the capture of seasonally available surface water; and, improved storage opportunities for surface and reclaimed water. Additional details about these alternative source options are provided in **Chapter 5**.

ENVIRONMENTAL PROTECTION FOR NATURAL SYSTEMS

Wetland Protection

Consumptive Use Permitting Rule 40E-2.301, Florida Administrative Code (F.A.C.), requires that permitted withdrawals not cause harm to wetlands or surface waters. In 2003, the SFWMD adopted rule revisions that better defined wetland protections in the *Basis of Review for Water Use Permit Applications* (SFWMD 2003) for presumption of harm. Because of the large number of wetland systems in the LWC Planning Area, these protections reduce opportunities to develop additional supplies in the Surficial Aquifer, and, depending on local geologic conditions, may also affect new supply development in portions of the IAS.

Regulatory and Environmental Efforts to Protect the Caloosahatchee River

The Caloosahatchee River currently supplies a large percentage of agricultural water demand in the Hendry and Glades county portions of the LWC Planning Area. In 2002, the District adopted a minimum flow and level (MFL) for the Caloosahatchee River—300 cubic feet per second (cfs) at S-79 Structure. The MFL provides a measure of resource protection for existing submerged aquatic vascular plant communities located downstream from the S-79 Structure (Rule 40-8.221(2), F.A.C.). Currently, during dry periods, flows delivered to the river from the S-79 Structure do not meet the established MFL. Consistent with Section 373.042(1), Florida Statutes (F.S.), the District developed a MFL recovery plan.

The District's proposed MFL recovery and prevention strategy for the Caloosahatchee River and Estuary consists of the construction of reservoirs and other projects in the C-43 Basin being completed under the CERP and Acceler8 projects. This includes construction of the 170,000 acre-foot, off-stream C-43 West Reservoir, which is discussed in **Chapter 3**. The C-43 West Reservoir Project is intended to improve both the high-flow and low-flow conditions of the river by attenuating some of the high-flow discharges to the estuary, storing these waters temporarily within the reservoir, and then releasing water to the estuary during dry periods to meet the MFL and proposed CERP environmental targets.

The SFWMD is also in the process of establishing an initial water reservation for the Caloosahatchee River and Estuary. This effort will focus on determining the volume, duration and timing of existing flows required to protect fish and wildlife resources within the Caloosahatchee River and Estuary. Under this program, all presently existing legal uses of water will be protected so long as the use is not contrary to the public interest (Section 373.223(4), F.S.). The first draft of the initial water reservation criteria is expected by early 2007.



Purple Gallinule

Freshwater Discharges Affecting Coastal Resources

Existing freshwater flow regimes are affecting the health of the Caloosahatchee River and Estuary, Estero Bay, and the Naples Bay and Rookery Bay areas. Urbanization in the bay watersheds has changed the timing, quality and distribution of freshwater discharges to these systems. Urbanization, water withdrawals, flood control activities and conditions in Lake Okeechobee have affected the timing and quality of fresh water in the

Caloosahatchee River and its estuary. In recent years, high flows and associated water quality impacts to the coastal resources have overshadowed the low-flow events.

On an annual basis, the Caloosahatchee River system typically experiences lower flows during the spring and higher flows during the summer and fall due to local rainfall conditions and releases from Lake Okeechobee. These seasonal swings are occasionally accentuated by severe drought or extreme rainfall conditions that upset the system by either reducing freshwater availability for urban and agricultural demands and the environment, or providing overwhelming volumes of fresh water. Both ends of this spectrum can be harmful to the environment and human use of the resource.

Since 2003, high-flow events have dominated the system. These events are characterized by large volume releases from Lake Okeechobee and high runoff volumes from the agricultural and urban watershed that can overwhelm the estuary with fresh water. Studies have indicated that freshwater discharges at the S-79 Structure in the 300 to 800 cfs range are optimal for the health of the Caloosahatchee River and Estuary, and that extended periods of flow above 2,800 cfs appear to be detrimental to most biota any time of the year.

The Lake Okeechobee & Estuary Recovery (LOER) Plan includes projects intended to improve environmental and water quality conditions in Lake Okeechobee and its tributaries and estuaries. This program focuses on improved land management practices and environmental protections within the areas contributing water to Lake Okeechobee, as well as the Caloosahatchee River and St. Lucie River basins, which receive water from the lake. Specific projects include the development of 48,000 acre-feet of storage for improvement of water quality flowing into Lake Okeechobee; revision of the lake regulation schedule to maintain lower water levels; and, identification of options for storing and/or disposing of excess surface water within the greater Lake Okeechobee watershed. This program offers direct benefits to the Caloosahatchee River in terms of water quality, timing and volume.

Urbanization in the Estero Bay watershed, which was estimated at 11 percent in 1995, is projected to be in excess of 35 percent by 2025. Deterioration of water quality in the Estero and Imperial rivers and Mullock Creek, all of which are in the Estero watershed, are adversely affecting conditions in Estero Bay.

Coastal rivers and streams in Collier County, including Gordon River, Rock Creek and Haldeman Creek, as well as the historic flowways to Naples Bay and Rookery Bay, have been altered by road and urban development over the past 40 years. Large freshwater discharges through a network of man-made canals and stormwater outlets cause fluctuation in the salinity levels, current flow patterns, as well as increased pollution loading to these coastal bays.

NEW CONNECTIONS TO LOCAL GOVERNMENT COMPREHENSIVE PLANS

During the 2002 through 2005 Florida legislative sessions, the statutory direction to link the water supply planning conducted by water management districts and the land use planning carried out by local governments throughout the state was clarified and strengthened. In general, the changes coordinate local government land use with regional water supply plans and establish a closer link between development decisions and the availability of water and public facility planning and funding.

Besides a general requirement to coordinate with regional water supply plans, some of the specific water supply-related connections under the new law that now must be addressed in local government comprehensive plans include:

General Requirement: Identify water supply sources needed to meet existing and projected water use demands for the established planning period of the comprehensive plan. (Section 163.3167(13), F.S.)

Future Land Use Element: Future land uses are to be based on the availability of water supplies, population projections and associated public facilities. (Subsection 163.3177(6)(a), F.S.)

Potable Water Element: This element must identify alternative and traditional water supply projects, conservation and reuse needed to meet the water needs identified in the regional water supply plan for the local government's jurisdiction. Within 18 months following an approved update of the regional water supply plan, comprehensive plans must: a) incorporate water supply projects from those identified in the regional water supply plan, or propose alternatives; and, b) include a minimum 10-year work plan for building all public, private and regional water supply facilities needed to serve existing and new development. (Subsection 163.3177(6)(c), F.S.)

Evaluation and Appraisal Report (EAR): Include an analysis of the implementation of the 10-year work plan for building all water supply facilities within the local government's jurisdiction. (Section 163.3191(2)(1), F.S.)

ADDITIONAL ISSUES

Need for Integrated Planning and Water Supply Efforts in Western Hendry and Glades Counties

Hendry County is projecting double-digit growth in annual population and water demand associated with large-scale residential and commercial development in the western portion of the county. Similar conditions are developing in western Glades County. Growth projections used by both counties are inconsistent with the University of Florida, Bureau of Economic and Business Research (BEBR) medium projections. Florida law directs the District to use BEBR in the absence of a ruling to the contrary from the Florida Department of Community Affairs (FDCA). The situation requires an integrated planning effort and discussions with the FDCA on the part of Hendry and Glades counties, and the City of LaBelle. Mounting development pressures will likely require a much more significant water supply initiative in this area than the demand projections within the 2005–2006 LWC Plan Update would indicate. The counties may want to consider forming a regional authority or other multijurisdictional organization to develop water and wastewater facilities to meet these growing needs.

Growth in Eastern Charlotte County

A 13,500-acre new town has been proposed in eastern Charlotte County on a portion of Babcock Ranch. As with growth in western Glades and Hendry counties, this development is not reflected in BEBR projections and therefore is not shown in **Chapter 2**. Large-scale development in remote areas creates challenges for providing adequate infrastructure for governmental services, including water supply. Limited data are available for the Babcock Ranch area, and water supply development would be focused on the use of brackish water from the Floridan Aquifer. This will be addressed in future amendments and/or updates of the LWC Plan Update as additional information becomes available.

Transferring Water between Water Management Districts

Interdistrict transfer is an important issue facing the LWC Planning Area between the SFWMD and Southwest Florida Water Management District (SWFWMD). The issue has been addressed by law under Section 373.2295, F.S., but has had limited implementation. Under Section 373.2295, F.S., interdistrict transfers are defined to include proposed withdrawals of groundwater from one water management district for use outside that district's boundaries; however, interdistrict transfers do not include withdrawals within a single county. If a cross water management district boundary transfer occurs within a single county, then the following public interest test applies, but the procedures do not.

Section 373.2295, F.S., requires the water management district in which the withdrawal is proposed to occur to review the consumptive use permit application. In addition to meeting the typical requirements related to reasonable-beneficial use and interference with existing legal users, users are required to satisfy a unique public interest test. In determining whether such a proposed transfer is consistent with the public interest, the reviewing water management district is to refer to the projected populations, as contained in future land use elements of the comprehensive plans of both the withdrawal and use areas together with other evidence on future needs of both areas. Section 373.2295(4), F.S., states that the proposed interdistrict transfer of groundwater will meet the public interest test: "...if the needs of the area where the use will occur and the specific area from which the groundwater will be withdrawn can be satisfied...."

A second significant definition of the consumptive use permit "public interest" test affecting long distance transport of water was adopted with the amendment of Section 373.223(3), F.S., which became known as the "local sources first" statute. It applies when transport of either ground or surface water across county boundaries is proposed, but not when crossing water management district boundaries. In such applications, the water management district is to consider a variety of public interest factors. For example, the factors include consideration of sources that are closer to the area of use; alternatives to the proposed source, including alternative technologies, such as desalination; potential environmental impacts; and, whether sources are adequate to supply water for existing legal uses and reasonably anticipated future needs of the planning region where the proposed source is located.

The Florida Department of Environmental Protection (FDEP) regulations require that both the sending and the receiving water management districts approve a proposed interdistrict transfer of surface water. The special public interest considerations that must be met include: water conservation measures and reuse implementation in the receiving area; the costs and benefits and environmental impacts that may occur in both areas; and, the present and future needs of the supplying area and whether these needs can be expected to be met.

As Florida's population continues to grow, the development of consensus on resource issues and conditions, and projected future needs along District boundaries is expected to become increasingly important.

SUMMARY

Projections show that the LWC Planning Area population will increase by approximately 674,000 people by 2025. Area water demand will increase by 197 MGD by 2025, with the bulk of that increase in the urban demand sector. The continued growth will require increased efficiencies in water use and alternative water supply development.

Development of alternative water supplies in the LWC Planning Area is well established, as it has long been recognized that historical fresh groundwater and

Caloosahatchee River water resources cannot support the ongoing growth in this region. Meeting the water demands associated with future growth will require an even greater focus on alternative water supplies and conservation than in the past. Efforts to develop traditional freshwater resources may be possible in some areas considering local hydrologic conditions, demand on the resource, and management options, such as rehydration opportunities and seasonal pumping schedules.

Other resource issues facing the area are also tied to the growing population in the LWC Planning Area and other parts of south Florida. Urbanization of watersheds in the Lee and Collier county areas is resulting in deterioration of water quality in streams discharging to coastal waters, such as Estero Bay and Naples Bay. The Caloosahatchee River and Estuary are similarly affected by urban and agricultural runoff, flood control discharges from Lake Okeechobee, and also from saltwater migration up the river during low-flow periods associated with drought and high water use.

Resource protection strategies and projects are under way to address these issues, including establishment of initial reservations for the Caloosahatchee River and construction of the C-43 West Reservoir to capture a portion of high flows for release during dry periods. Ongoing watershed protection projects in Lee and Collier counties include the 55,000-acre Picayune Strand Restoration Project, which will hold more water on the land, thereby improving the timing and dispersion of discharge to coastal waters.

These issues will require constant attention to ensure that the water resources and the environment that depends on these resources remain protected, while the needs of a growing population are met.

